

Subject Index

A

- Accounting; 1963-64 legal developments in, for water utilities, 28
- use of, as management tool, 1356
- Activated carbon; granular beds; pesticide removal by, 195
- powdered; pesticide removal by, 190
- Acrolein; effects of potassium permanganate on, 480
- Acrylic acid; effects of potassium permanganate on, 479
- Air-conditioning; regulation of, 1456
- Alabama; *see* Birmingham
- Alaska; *see also* Anchorage, Point Barrow
- effects of Good Friday earthquake in, 123
- Algae; removal of, by microstraining at Ilion, N.Y., 1425
- Allyl alcohol; effects of potassium permanganate on, 479
- Allylamine; effects of potassium permanganate on, 480
- Alum; effect of, on cation-exchange capacity in coagulation studies, 340
- liquid; use of, in treatment plants, 309
- Aluminum sulfate; electrophoretic studies of coagulation and flocculation with, 354
- microelectrophoretic studies of coagulation with, 801
- American Water Works Association; advancement and public information program of, 505
- amendments to bylaws (Art. VIII, Sec. 8.1), 972
- audit of funds of, 539
- committee reports and activities; education, 513
- professional and administrative practice, 515
- research, 511
- standardization, 523
- comparison of standards for asbestos-cement pipe with those of International Organization for Standards, 142
- president (E. Jerry Allen); address by, 1
- publications report of, 532
- section membership awards of, 541
- standards; Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other

- Liquids (ASA A21.51-1965, AWWA C151-65), 1211
- Sodium Chlorite (B303-65T), 938
- Thickness Design of Ductile-Iron Pipe (ASA A21.50-1965, AWWA H3-65), 1053
- 2-in. and 24-in. Cast-Iron Pipe, Centrifugally Cast, for Water and Other Liquids (ASA A21.12-1965, AWWA C112-65), 1201
- task group reports; artificial ground water recharge, 629
- diatomite filtration, 157
- Ammonia; manufacture of, 1320
- Analysis; research needed in new methodologies for, of water impurities, 4
- Anchorage, Alaska; earthquake recovery at, 571
- effects of Good Friday earthquake on water supplies of, 126
- Aniline; effects of potassium permanganate on, 481
- Antimony; significance and occurrence of trace quantities of, 150
- Aqueduct; design of, for industrial supply at Birmingham, Ala., 1367
- Arizona; water resource problems of, 1239
- Arkansas; *see* El Dorado, Little Rock
- Arkansas-Red River Basins; control of natural brine in, 383, 707
- Asbestos-cement-pipe; *see* Pipe (asbestos cement)
- Atomic absorption photometer; *see* Laboratory methods and equipment (atomic absorption photometer)
- Auditing; use of, as management tool, 1356
- Austin, Tex.; relocation of utility lines at, 735
- Automation; use of, in Great Britain, 828

B

- Backflow; *see* Distribution systems (back-flow)
- Bacteria; coliform; destruction of, on membrane filter holders with ultraviolet light, 501
- detection of, by fluorescent-antibody method, 99

Jul. 811-942; Aug. 943-1072; Sep. 1073-1230; Oct. 1231-1354; Nov. 1355-1498; Dec. 1499-1632

- Bacteria (*contd.*); fecal; medium for membrane filter technique for, 208
 enteropathogens; occurrence of, in water, with low *Esch. coli* titer, 1572
Escherichia coli; occurrence of, and *Salmonellae* in water with low titer of, 1572
 sensitivity of, and poliovirus to combined chlorine, 893
 sulfate-reducing; control of, 1011
 method for, 1012
 Baltimore, Md.; cost allocation for capital improvements between city and county of, 722
 Barium; significance and occurrence of trace quantities of, 151
 Bentonite; *see* Clay (bentonite)
 Benzaldehyde; effects of potassium permanganate on, 481
 Benzyl alcohol; effects of potassium permanganate on, 480
 Beryllium; significance and occurrence of trace quantities of, 151
 Bimetallic glassy phosphates; corrosion control with, 783
 Birmingham, Ala.; design of industrial water line at, 1367
 Bismuth; significance and occurrence of trace quantities of, 151
 Blue Spruce, Colo.; pipeline freeze problems in, 747
 Bonds; effect of interest rates of, on water rates, 1506
 Brine control; projects for, in Arkansas-Red River Basin, 707
 British Columbia; water resources of, 1243
 Budget; use of, as management tool, 1356
 Butterfly valves; *see* Valves

C

- Cachuma Project (Calif.); costs of diatomite filtration plant operation in, 173
 Cadmium; significance and occurrence of trace quantities of, 151
 Calcite; deposition of linings of, in small-diameter pipe, 1328
 California; *see also* Cachuma Project; Delta-Mendota Canal; Lompoc; Metropolitan Water District; San Diego; Second Los Angeles Aqueduct; Spring Creek
 1963-64 rate commission rulings in, affecting rate base evaluating, 18
 water resource, developments and problems of, 1248
 Canada; *see* James Bay

- Capital improvements; cost allocations for, between city and county of Baltimore, 722
 Carbon; granular; filtration with for removal of organics, 1440
 Carbon adsorption method; *see* Laboratory methods and equipment (carbon adsorption method)
 Carbon-chloroform extraction; *see* Laboratory methods and equipment (carbon-chloroform extraction)
 Cedar River watershed; effect of deforestation on ground water of, 1301
 Cement-mortar; lining of small pipe with, at Philadelphia, Pa., 1513
 pneumatic application of, for tank coatings, 1145
 Cement-mortar linings; tuberculation of, in cast-iron pipe, 773
 Chamber of Commerce of the United States; water resource policies of, 1499
 Chicago, Ill.; effect of Lake Michigan pollution on supply of, 841
 Chlorination; effect of, on pesticides, 189
 Chlorine; free; determination of, by methyl orange, 1575
 removal of, by granular-carbon filtration, 1443
 Chromatography; *see also* Laboratory methods and equipment (carbon-chloroform extraction, chromatography)
 electron capture, gas; use of, for pesticide determination, 1023
 gas-liquid; cleanup procedures with, for aquatic herbicide determination, 1030
 ion exchange; cleanup procedures with, for aquatic herbicide determination, 1029
 microcoulometric gas; analysis of pesticides with, 186
 partition; cleanup procedures with, for aquatic-herbicide determination, 1029
 Chromium; significance and occurrence of trace quantities of, 151
 Cincinnati, Ohio; metallizing of water tanks at, 585
 Clay; bentonite; effect of, on coagulation, 338
 kaolinite; effect of, on coagulation, 338
 Climatology; water resource aspects of, 427
 Coagulation; aids for, 800
 cation-exchange capacity and pH in, 327
 electrophoretic studies of aluminum sulfate for, and flocculation, 354
 hydrolyzing coagulants for, of organic color, 1149
 mechanism of polyelectrolytes in, 1547

- method for plant cost reduction through integration of, with other processes, 1333
- microelectrophoretic studies of, with aluminum sulfate, 801
- pesticide removal by, and filtration, 188
- Cobalt; radioactive; determination of, 234
- significance and occurrence of trace quantities of, 151
- Cold-weather operations; electric thawing of mains; utility liability for injury caused in, 13
- pipeline freeze problems of, in Colorado mountains, 746
- Coliform bacteria; *see* Bacteria
- Colloids; clay; mechanism of polyelectrolyte coagulation of, 1547
- Colorado; *see also* Frisco; Blue Spruce; Granby; Leadville
 - pipeline freezing in mountain towns of, 746
- Colorado River; trace elements in, 154
- Computers; network analysis in Japan with, 1346
 - use of, as tool of management, 1358
- Concrete pipe; *see* Pipe (concrete)
- Condemnation proceedings; legal developments in, 32
- Connecticut; *see* Groton, New Haven Water Co.
- Conservation; soil; effect of, on runoff, 544
- Consulting engineers; role of, in rate design, 1505
- Contamination; *see* Pollution
- Copper; significance and occurrence of trace quantities of, 151
- Cordova, Alaska; effects of Good Friday earthquake on water supplies of, 129
- Corrosion; control of, with bimetallic glassy phosphates, 783
 - problem of, at Lompoc, Calif., 623
 - protection properties against, of portland cement concrete, 1038
 - sodium hexametaphosphate for control of, 784
- Costs; allocation of, for capital improvements between city and county of Baltimore, Md., 722
 - metallizing water tanks at Erie, Pa., and Cincinnati, 585
 - chemical; correlation of degree of pollution with, 293
 - diatomite filtration plant, 172
 - effect of, on water resources policy, 258
 - effect of, on water use, 1275
 - dual water systems, 1073

- granular-carbon filters, 1446
- gross annual and per capita increases in, for water service in United States, 1504
- historical relation of, to rates, 943
- iodine used as a water disinfectant, 1413
- ion-exchange reclamation of reuseable supplies, 1121
- multistage flash distillation plant at San Diego, Calif., 1111
- nuclear craters for recharge, 434
- ozone treatment in Ireland, 1189
- prestressed-concrete tanks, 595
- Second Los Angeles Aqueduct, 704
- steel tanks, 1398
- supervisory-control system at New Haven Water Co., 761
- treatment plant; method for reduction of, through integration of processes, 1333
- Cross connection; *see* Distribution systems (cross connections)

D

- Data processing; *see* Computers
- Dayton, Ohio; remote control at, 1509
- Decontamination; *see* Treatment
- DDE; physiologic effects of, 1311
- DDT; *see also* Pesticides
 - physiologic effects of, 1311
- Defluoridation; instances of, in Southern California, 245
- Delinquent accounts; *see* Management (delinquent accounts)
- Delta-Mendota Canal (Calif.); sedimentation in, 375
- Demand; daily per capita; in United States, 1960 and projected, 551
 - industrial; magnitude of, in United States, 832
- Demineralization; *see* Treatment
- Depreciation; legal developments in, 29
 - role of, in rate design, 1505
- Desalinization; drawbacks of, as a source of large supplies, 551
 - study of, in Metropolitan Water District of Southern California, 694
- Developing countries; investment priorities in, 955
- Detergents; removal of, by granular-carbon filtration, 1441
- Diatomite filter aids; *see* Filter aids (diatomite)
- Diatomite filters; *see* Filters (diatomite)
- Dieldrin; *see* Pesticides
- Diffuser system; ozone treatment with, 1176

- Disinfection; use of iodine for, 1401
 Distillation; multistage flash; use of, at San Diego, Calif., 1107
 steam; cleanup procedure with, in aquatic herbicide determination, 1030
 Distribution systems; backflow; control of, and cross connections at San Diego, Calif., 437
 cleaning and cement-mortar lining of small pipe in, at Philadelphia, Pa., 1513
 computer analysis of, in Japan, 1346
 cross connections; control of, and backflow prevention at San Diego, Calif., 437
 description of, for dual water systems, 1073
 design of, for industrial supply at Birmingham, Ala., 1367
 developments in plastic pipe for, 1385
 hydraulic gradient control in, by automatic valves, 763
 pipelines; relocation of, in Southwest, 722
 pumped equalizing storage, operating options for, 869
 supervisory-control system for, of New Haven Water Co.
 water utility liability for injury due to leaks in, 11
 Districts; statistics on, in United States, 569
 Dual water system; costs and description of, 1073

E

- Economics; theories of, related to sound extension policies, 1289
 El Dorado, Ark.; relocation of utility lines at, 730
 Electrophoresis; *see* Laboratory methods and equipment (electrophoresis)
 Embarras River Basin, Ill.; water use and population in, 391
 Emergencies; oil spills; interception basins for, 543
 Employees; *see* Labor relations
 Endrin; *see* Pesticides
 Equipment; remote control; use of at Dayton, Ohio, and Pinellas County Water System, Clearwater, Fla., 1509
 Erie, Pa.; metallizing of water tanks at, 585
 taste and odor removal at, with potassium permanganate, 1451
Escherichia coli; *see* Bacteria (*Escherichia coli*)
 Ethyl formate; effects of potassium permanganate on, 478

- Extensions; legal developments in, 24
 policy for, related to economic theory, 1289
 principles of discounting for, 397

F

- Fernow Experimental Forrest, W.Va.; forest management research in, 448
 Ferrous iron; evaluation of orthophenanthroline method for, 926
 Filter aids; costs and effects of, in removal of soluble iron by diatomite filtration, 465
 diatomite; discussion of, 164
 Filters; bed materials; new method for handling of, 321
 diatomite; bibliography on, 174
 components and operation of, 166
 design of, 170
 turbidity removal by, 159
 granular carbon; design of, 1445
 membrane; decontamination of holders of, with ultraviolet light, 500
 multiple bed; Philadelphia Suburban Water Co. experience with, 314
 slow sand; effect of microstraining on operation of, at Iliou, N.Y., 1426
 study of backwash and medium control of, with prototype modular filter components, 766
 Filtration; carbon; bed design study on, at Nitro, W.Va., 663
 diatomite; cost data on, 172
 iron removal by, 163
 manganese removal by, 163
 soluble-iron removal by, 458
 tabulated data on municipal use of, in United States and Canada, 160
 use of, at Lompoc, Calif., 614
 use of, in manganese removal process, 655
 granular carbon; removal of organics by, 1440
 hydraulic characteristics of three sand textures in, 675
 method for plant cost reduction through integration of, with other processes, 1337
 pesticide removal by, and coagulation, 188
 plastic media for, 85
 Financing; effect of, on rates, 1506
 innovations in, for municipal utilities, 561
 nine-year needs for, of municipal utilities in United States, 562
 priorities for, in developing countries, 955
 Fire protection; utility liability for losses due to failure of, 13

- Flocculation; electrophoretic studies of aluminum sulfate for, and coagulation, 354
method for plant cost reduction through integration of, with other processes, 1336
physical aspects of, 885
Flood control; costs of, as element in water resource planning, 1276
Florida; *see* Pinellas County Water System
Fluorescent-antibody method; *see* Laboratory methods and equipment
Fluoridation; *see also* Defluoridation
status of, in United States and Canada, 1963, 76
status of, in United States and Canada, 1964, 1472
Frisco, Colo.; pipeline freeze problems in, 747

G

- Government; United States; Interstate Commerce Commission; regulations of, for classification and shipment of chemicals, 202
National Water Emergency Plan of, 132
USPHS; relation of *Drinking Water Standards* of, to definition of quality, 287
summary by, of water facilities of communities of 25,000 or more, 1360
surveillance of trace elements by, 150
Granby, Colo.; pipeline freeze problems in, 748
Great Britain; status of water supply research in, 828
supply control trends in, 824
treatment trends in, 826
automation in, 828
Great Lakes; regulation of levels of, 751
trace elements in, 155
Groton, Conn.; expansion of treatment facilities at, 298
Ground water; development and uses of, 1123
effect of deforestation on, 1301
in Alaska; effect on, of Good Friday earthquake, 130
municipal use of, by United States communities of 25,000 or more, 1362
occurrence of nitrates in, 1323
use of, in Arizona, 1240
well point systems; use of, for municipal supplies, 1131

H

- Hardness problem of, at Lompoc, Calif., 608
Health; *see also* Fluoridation, Pollution, Safety programs
environmental; effects of population changes on, 811
water utility liability for hazards to, 12
Herbicides; aquatic; methods for, 1028
identification and removal of, 1016
2,4-Dichlorophenoxyacetic acid; removal of derivatives of, 221
Hydroelectric power; *see* Power (hydroelectric)
Hydrography; methods of, for measuring rainfall, 965
Hydrology; effect of forest management on, of watersheds, 448
ground water; effect of deforestation on, 1301
hydraulic and sediment data; concurrent collection of, in rivers, 1135
International Hydrological Decade; description of, 546
status of, 819
water resource aspects of, 424

I

- Ilion, N.Y.; microstraining at, 1422
Illinois; *see* Chicago, Embarras River Basin
Impoundments; effect of site character of, on quality, 1528
effects of, on quality, 51
Infrared photography; *see* Laboratory methods and equipment (infrared photography)
Injection wells; *see* Wells (injection)
Insecticides; removal of, by granular-carbon filtration, 1441
International Hydrological Decade; *see* Hydrology (International Hydrological Decade)
International Organization for Standards; effect of, on materials and equipment standards in Latin America, 142
Iodine; use of, for water disinfection, 1401
Ion exchange; *see* Treatment (ion exchange)
Ireland; ozone treatment in, 1187
Iron; problem of, and dissolved oxygen in wells at Salisbury, Md.
removal of, with diatomite filtration, 163
significance and occurrence of trace quantities of, 151
soluble; removal of, by diatomite filtration, 458

J

- James Bay, Canada; diversion schemes to supply Great Lakes, St. Lawrence River from, 553
 Japan; network analysis with computer in, 1346

L

- Labor relations; status of in San Diego, Calif., 147
 Laboratory methods and equipment; *see also* Chromatography, Distillation, Spectrophotometry
 aquatic herbicides; methods for, 1028
 aqueous manganese; analytical chemistry of, 107
 atomic absorption photometer; description of, for water analysis, 492
 carbon adsorption method; evaluation of, 791
 sampling conditions in, 215
 carbon-chloroform extraction; detection of trace organic chemicals with, 453
 chromatography; gas; detection of trace chemicals with, 455
 electrophoresis; clay mobility measurement with, in coagulation studies, 331
 treatment plant control with, and threshold odor measurement at Philadelphia, 363
 free chlorine; determination of, by methyl orange, 1575
 improvements in methods for, 485
 studies with, of coagulation with aluminum sulfate, 801
 studies with, on aluminum sulfate in coagulation and flocculation, 354
 ferrous iron; evaluation of orthophenanthroline method for, 926
 fluorescent-antibody method, detection of coliform-organisms by, 99
 infrared photography; use of, in water resources research, 834
 low-angle turbidimeter; construction details of, 914
 membrane filter technique; fecal-coliform medium for, 208
 methylene blue method; cation-exchange capacity measurement with, 328
 most probable numbers; graphic evaluation of, 640
 nitrate; method for, with rhenium and syn-phenyl-2-pyridyl ketoxime, 935

- orthophosphate; determination of, in fresh and saline waters, 917
 ozone; method for, 1176
 pesticides and herbicides; identification and removal of, 1016
 pesticides; method for, by electron capture gas chromatography, 1023
 radioactive cobalt; determination of, 234
 radioactive phosphorus; determination of, 231
 sulfate-reducing bacteria; method for, 1012
 turbidity; measurement of, 901
 ultraviolet light; use of, to decontaminate membrane filter holders, 500
 Lake Michigan; effect of pollution in, on Chicago supply, 841
 Latin America; material and equipment standards in, 139
 Lead; significance and occurrence of trace quantities of, 151
 Leadville, Colo.; pipeline freeze problems in, 748
 Legislation and regulation; developments in, of water utilities, 15
 inventory of, affecting air conditioning practices in community survey, 1459
 review of, affecting water use in New York state, 39
 Liability; *see also* Litigation, Legislation and regulation
 utility; extent of, for electrical grounding devices, 13
 extent of, for fire losses, 13
 extent of, for health hazards, 12
 extent of, for injury, 10
 extent of, for injury, due to distribution system leaks, 11
 extent of, in electric thawing of mains, 13
 interpretation of negligence in, for injury, 10
 Lime-soda ash treatment; use of, at Lompoc, Calif., 614
 use of, in manganese removal process, 655
 Lindane; *see* Pesticides
 Litigation; *see also* Liability
 developments in, affecting water utilities, 15
 results of, affecting air-conditioning practices, 1457
 Little Rock, Ark.; relocation of utility lines at, 733
 Lompoc, Calif.; quality improvement at, 607
 Los Angeles Aqueduct; construction of, 699

M

- Mains; service lives of, at Springfield, Mass., 410
Maintenance; methods of, for prestressed-concrete tanks, 591
Management; delinquent accounts; handling of, in Michigan, 279
labor relations policy of, at San Diego, Calif., 147
recruitment policies of, 686
reorientation of, to meet demand for quality, 677
salaries of, 687
techniques of, 1355
wage policy; administration of, through job evaluation, 262
Manganese; aqueous; analytical chemistry of, 107
removal of, by controlled precipitation and filtration, 655
removal of, with diatomite filtration, 163
significance and occurrence of trace quantities of, 151
Maryland; *see* Baltimore, Salisbury
Massachusetts; *see* Springfield
Membrane filters; *see* Filters (membrane)
Membrane filter technique; *see* Laboratory methods and equipment (Membrane filter technique)
Metallizing; experience with, of water tanks at Erie, Pa., and Cincinnati, 585
Meteorology; water resource aspects of, 425
Metering; simultaneous collection by, of streamflow data in rivers and sediment samples, 1135
Meters; standards for, in Latin America, 144
Methemoglobinemia; cause and occurrence of, 1323
Methyl orange; determination of free chlorine by, 1575
Methylene blue method; *see* Laboratory methods and equipment
Metropolitan Water District, Calif.; desalinization study at, 694
Michigan; handling of delinquent accounts in, 279
Microelectrophoresis; *see* Laboratory methods and equipment (microelectrophoresis)
Microstraining; use of, at Iliion, N.Y., 1422
Mississippi River; trace elements in, 155
Molybdenum; significance and occurrence of trace quantities of, 151
Morse, W. Chester; Fuller Society tribute to, 1195

- Most probable numbers; *see* Laboratory methods and equipment
Multiple-bed filters; *see* Filters (multiple bed)

N

- National Water Emergency Plan; provisions of, 132
Nebraska; *see* Omaha
Negligence; *see* Liability
Nematodes; occurrence of, in aerobic waste treatment plants, 1561
New Haven (Conn.) Water Co.; supervisory control system at, 755
New Jersey; rate commission rulings in, affecting rate base evaluation, 18
regulations for design of public water facilities, revisions of, 737
New York; *see* Iliion, New York City, Rochester
costs of diatomite filtration plant operation in, 172
water law in, 39
New York City; emergency supplies for, 1099
Nickel; significance and occurrence of trace quantities of, 151
Nitrate; method for, with rhenium and synphenyl-2-pyridyl ketoxime, 935
Nitrates; environmental occurrence and physiological effects of, 1319
Nitro, W.Va.; carbon bed design study at, 663
Nitrogen; atmospheric; fixation of, 1321
North Carolina; *see* Raleigh
Nuclear attack; provisions of National Water Emergency Plan for response to, 132
Nuclear energy; creation of recharge craters with, 429

O

- Ohio; *see also* Cincinnati, Dayton
1963-64 rate commission rulings in, affecting rate base evaluation, 18
Ohio River; trace elements in, 154
Oil spills; interception basins for, 543
Oklahoma; *see* Oklahoma City
Oklahoma City, Okla.; relocation of utility lines at, 731
Omaha, Neb.; deposition of calcite linings in pipe at, 1329
Oregon; water resources problems of, 1235, 1257

- Organic color; coagulation of, with hydrolyzing coagulants, 1149
- Organics; effects of potassium permanganate on, 472
- removal of, by granular-carbon filtration, 1440
- trace; detection of, 453
- Orthophenanthroline method; evaluation of, for ferrous iron, 926
- Orthophosphates; determination of, in fresh and saline waters, 917
- Otto partial-injection system; ozone treatment with, 1176
- Oxygen; dissolved; problem of, and iron in wells at Salisbury, Md.
- Ozone; effect of, on pesticides, 189
- methods for, 1176
- use of, in water treatment, 1167

P

- Pacific Northwest; *see* United States (Pacific Northwest)
- Palmer, Alaska; effects of Good Friday earthquake on water supplies of, 127
- Pan-American Standards Committee; work of, on standards for equipment and materials in Latin America, 139
- Parathion; *see* Pesticides
- Payments and refunds; legal developments and practices in, permitted to water utilities, 27
- Pennsylvania; *see* Erie, Philadelphia, Philadelphia Suburban Water Co.
- Personnel; engineering; recruitment and training of, 267
- management techniques for control of, 1357
- recruitment of, 686
- wages; administration of, through job evaluation, 262
- Pesticides; detection of trace quantities of, 456
- effectiveness of treatment processes for removal of, 181
- identification and removal of, 1016
- method for, by electron capture gas chromatography, 1023
- physiologic effects of, 1311
- tastes and odors of, 184
- toxicity of, 183
- Phenol; effects of potassium permanganate on, 481
- Phenols; trace; detection of, 453
- Philadelphia, Pa.; cleaning and cement-mortar lining of small pipe at, 1513
- deposition of calcite linings in pipe at, 1329
- operating options for pumped equalizing storage in, 869
- ozone treatment at, 1193
- treatment plant control at, through electrophoresis and threshold odor measurements, 363
- Philadelphia Suburban Water Co., Bryn Mawr, Pa.; multiple-bed filter tests at, 314
- Phosphorus; problems of, in water supplies, 1431
- radioactive; determination of, 231
- Photography; examination of wells by, 441
- Pinellas County Water System, Clearwater, Fla.; remote control at, 1509
- Pipe; asbestos cement; standards for, in Latin America, 143
- cast iron; durability of cement-mortar linings of, 773
- standards for, in Latin America, 144
- tuberculation of cement-mortar linings of, 773
- cleaning and cement-mortar lining of, at Philadelphia, Pa., 1513
- concrete; standards for, in Latin America, 143
- ductile iron; standard for, 1211
- standard for thickness design of, 1053
- plastic; developments in, 1385
- small diameter; deposition of calcite linings in, 1328
- Pipelines; relocation of, in Southwest, 722
- Planning; history of, for Raleigh, N.C., supply, 1294
- relation of, to rate design, 1507
- status of, for water needs of Pacific Slope, 1238
- Plastics; use of, for prefiltration media, 85
- Point Barrow, Alaska; supply developments at, 858
- Poliovirus; *see* Virus (poliovirus)
- Pollution; brine; control of, in Arkansas-Red River basins
- chemical; spills from common carriers as causes of, 201
- criteria of, related to demand, 1277
- definition of quality water related to, 286
- degree of, correlated with chemical costs, 293
- industrial; methods for control of, 625
- environmental-health problems related to, 813
- research needed in removal of, 5
- Lake Michigan; effect of, on Chicago supply, 841
- mineral; research needed to determine

- optimum levels of, 6
- pesticide; effectiveness of treatment processes in removal of, 181
- population density related to, 550
- problem of, and siltation in Spring Creek, Calif., 986
- virus; research needed for detection and identification of, 4
- water resources aspects of, 258
- Polyelectrolytes; effect of, on coagulation with aluminum sulfate, 801
- mechanism of, in coagulation of colloidal suspensions, 1547
- Polymers; labeled; destabilization of dilute clay suspensions with, 1547
- Population; effect of, on pollution levels, 550
- effects of changes in, on environmental-health problems, 811
- growth rate of, in United States, 561
- relation of, to demand in United States, 1960 and projected, 551
- Portland cement; concrete; corrosion protection properties of, 1038
- Potassium permanganate; effect of, on pesticides, 189
- effects of, on pure organic compounds, 472
- manganese removal with, 655
- taste-and-odor removal with, at Erie, Pa., 1451
- Power; hydroelectric; effects of technologic advances on, on impoundment needs, 1275
- Prefiltration; *see* Treatment
- Prestressed concrete; tank construction with, 591
- Propionaldehyde; effects of potassium permanganate on, 478
- Propylamine; effects of potassium permanganate on, 478
- Pumping; continuous; analysis of, for serving fringe areas, 601
- operating options in, for equalizing storage, 869
- Purification; *see* Treatment
- Pyruvic acid; effects of potassium permanganate on, 479

Q

- Quality; definition of, 286
- effect of impoundments on, 51
- effect on, of reservoir site character, 1528
- management reorientation to meet challenge of, 677
- problems in assignment of cost-benefit ratios for, 120

R

- Rainfall; measurement of, 965
- Raleigh, N.C.; supply planning at, 1294
- Rate commissions; case law developments affecting function of, 17
- rate base valuation rulings of, 18
- Rates; basis for, 273
- commission ruling affecting evaluation of bases for, 18
- design of, 1505
- effects of various elements on, in water and other utilities, 554
- historical relation of, to costs, 943
- Recharge; injection wells for, 629
- nuclear craters for, 429
- water mound behavior beneath square basins for, 349
- Reclamation; ion exchange for, of reuseable supplies, 1113
- Red River Basin; brine control in, 707
- Refunds; *see* Payments and refunds
- Reservoirs; effect on water quality of site character of, 1528
- Reuse; discussion of, as an aspect of water resources policy, 257
- Rochester, N.Y.; study of filter backwash and medium control at, with prototype modular filter components, 766
- Runoff; effect of soil conservation on, 544

S

- Safety; accident investigation and record keeping for, 574
- methods for, in work areas on highways, 948
- Salisbury, Md.; dissolved oxygen and iron in wells of, 239
- Salmonellae*; occurrence of, in water with low *Esch. coli* titer, 1572
- Salt water conversion; history of, in Kuwait, 420
- San Diego, Calif.; cross-connection control and backflow prevention at, 437
- labor-management relations in, 147
- sea water distillation at, 1106
- Sedimentation; occurrence of, in Delta-Mendota Canal (Calif.), 375
- Service area; legal developments affecting boundaries of, 30
- Settling; integration of, with other processes, 1337
- Seward, Alaska; effects of Good Friday earthquake on water supplies of, 128

- Siltation; problem of, and pollution in Spring Creek, Calif., 986
- Silver; significance and occurrence of trace quantities of, 151
- Sodium chlorite; standard for, 938
- Sodium hexametaphosphate; corrosion control with, 784
- Sodium (ionized); effect of, on coagulation, 337
- South Dakota; costs of diatomite filtration plant operation in, 172
- Southern California; defluoridation in towns of, 245
- Southwest; *see* United States (Southwest)
- Spectrography; detection of trace elements by, 152
- Spectrophotometry; determination of aquatic herbicides by, 1031
- Spring Creek, Calif.; siltation and pollution problems in, 986
- Springfield, Mass.; service lives of mains at, 410
- Standards; *see also* American Water Works Association; Pan-American Standards Committee; International Organization for Standards
material and equipment; status of, in Latin America, 139
- Storage; pumped equalizing; operating options for, 869
- Surface water; in Alaska; effect on, of Good Friday earthquake, 131
municipal use of, by United States communities of 25,000 or more, 1362
- T**
- Tanks; metallizing of, at Erie, Pa., and Cincinnati, 585
pneumatic application of cement-mortar coatings for, 1145
prestressed concrete; design, economy, maintenance, and repair of, 591
standards for, 1392
stronger steel for, 1390
- Tastes and odors; pesticides as causes of, 184
threshold odor number; treatment control with measurement of, and electrophoretic data at Philadelphia, 363
removal of, with potassium permanganate at Erie, Pa., 1451
- Telemetering; use of, at New Haven Water Co., 755
- Texas; *see* Austin
- Thawing; *see* Cold-weather operation
- Threshold odor test; results of, for pesticides, 184
- Tin; significance and occurrence of trace quantities of, 151
- Trace chemicals; detection of, 453
environmental-health problems related to, 814
- USPHS Water Pollution Surveillance System monitoring of, 150
- Training; methods of, for engineers, 267
- Treatment; *see also* Defluoridation, Filters
coagulation; aids for, 800
mechanism of polyelectrolytes in, 1547
pesticide removal with, and filtration, 188
control of sulfate-reducing bacteria, by, 1011
demineralization; research needed to find new methods of, 6
disinfection; use of iodine for, 1401
effectiveness of, in pesticide removal, 181
expansion of facilities for, at Groton, Conn., 298
fluoridation; status of, in United States and Canada, 1963, 76
status of, in United States and Canada, 1964, 1472
identification and removal of herbicides and pesticides by, 1016
ion exchange; reclamation of supplies by, 1113
iron removal; diatomite filtration for, 163
liquid alum as used in, 309
manganese removal; controlled precipitation and filtration for, 655
diatomite filtration for, 163
phosphorus removal by, 1437
plant features for, at Lompoc, Calif., 619
prefiltration; plastic media for, 85
process integration in, to reduce plant costs, 1333
research needs for, 3, 5
trends in, in Great Britain, 826
types of, used by United States communities of 25,000 or more, 1303
use of ozone in, 1167
- Tuberculation; occurrence of, in cement-mortar-lined cast-iron pipe, 773
- Turbidity; clay; mechanism of polyelectrolyte coagulation of, 1547
measurement of, 901
removal of, by diatomite filtration, 159

U

- Ultraviolet light; decontamination of membrane filter holders with, 500
- United States; industrial demand in, 832
- Pacific Northwest; diversion schemes to supply Southwest from, 552
- water resource problems of, 1238
- water supply in, 973
- Southwest; relocation of utility lines in, 727
- supply prospects of, 549
- total and daily per capita requirements of, 1960 and projected, 551
- water resource problems of, 1231
- Utah; water resource problems of, 1262

V

- Valdez, Alaska; effects of Good Friday earthquake on water supplies of, 128
- Valves; automatic; control of hydraulic gradients with, 763
- butterfly; operator torques for, 1139
- Vanadium; significance and occurrence of trace quantities of, 151
- Virus; poliovirus; sensitivity of, and *Escherichia coli* to combined chlorine, 893
- research needed for detection and identification of, in water, 4

W

- Washington; *see also* Cedar River watershed status of water resources in, 1257
- Wastes; disposal of, in Far North, 858
- nitrates in, 1319
- occurrence of nematodes in aerobic treatment plants for, 1561
- occurrence of phosphorus in, 1436
- Water resources; Chamber of Commerce of the United States policies on, 1499
- effects on, of technologic developments, 423
- future demand in United States related to, 549
- James Bay, Canada; diversion schemes to supply Great Lakes-St. Lawrence River from, 553
- management of, in watersheds and reservoirs, 981
- national and western United States problems in, 1231

- Pacific Northwest; diversion schemes to supply Southwest from, 552
- policy issues vital to, 255
- soil conservation; effect of, on runoff, 544
- status of, in Arizona, 1239
- status of, in British Columbia, 1243
- status of, in California, 1248
- status of, in Oregon and Washington, 1257
- status of, in Pacific Northwest, 973
- status of, in Utah, 1262
- utilization of, in Kuwait, 410

- Water rights; public policy issues with respect to, 260
- Water supply; demand in United States, 1960 and projected, related to, 551
- developments in, in Far North, 858
- drought-emergency provisions for, 1099
- dual systems of, 1073
- effect on, of Good Friday earthquake in Alaska, 123
- elements affecting national planning for, 1273
- planning for, at Raleigh, N.C., 1294
- prospects of, in United States, 549
- second Los Angeles Aqueduct; construction of, 699
- trends in control of, in Great Britain, 824
- Water utilities; expanded concept of service rendered by, 1285
- historical relation of costs and rates in, 943
- municipal; USPHS 1964 summary of, in communities of 25,000 or more, 1360
- public; revisions of New Jersey regulations for design of, 737
- Watersheds; effect of forest management on, 448
- management of, and reservoirs, 981
- Well point systems; use of, for municipal supplies, 1131
- Wells; injection; for recharge, 629
- maintenance of efficiency of, 996
- photographic examination of, 441
- West Virginia; *see* Fernow Experimental Forest, Nitro
- Whittier, Alaska; effects of Good Friday earthquake on water supplies of, 129
- Wichita, Kan.; maintenance of well efficiency at, 996

Z

- Zinc; significance and occurrence of trace quantities of, 151

Author Index

- ADAMS, ARMAND L.; New York state water law, 39
- ADAMS, THOMAS V.; recruitment and training of engineers, 267
- ALDRICH, ELLWOOD C.; service lives of water mains at Springfield, Mass., 410
- ALLEN, E. JERRY; a tribute to W. Chester Morse, 1195
- ALLEN, E. JERRY; water, men, and management, 1
- ALY, OSMAN M. & FAUST, SAMUEL D.; removal of 2,4-dichlorophenoxyacetic acid derivatives from natural waters, 221
- ANSPACH, FREDERICK R. (with BAKER & CAMPBELL); electrophoretic and taste and odor measurements in plant control, 363
- AUBERY, MELVILLE W.; description of continuous pumping, 601
- AUSTIN, JOHN H. (with CHAUDHURI & ENGELBRECHT); nematodes in an aerobic waste treatment plant, 1561
- BAFFA, JOHN J. (chairman); experience with injection wells for artificial ground water recharge, 629
- BAKER, CHARLES R. (with LYNCH & HABERER); experiences with microstraining at Ilion, 1422
- BAKER, ROBERT A.; CAMPBELL, SYLVESTER J.; & ANSPACH, FREDERICK R.; electrophoretic and taste and odor measurements in plant control, 363
- BANKS, HARVEY O.; *joint discussion*—water needs of the Pacific slope, 1238
- BAUMANN, E. ROBERT (chairman); diatomite filters for municipal use, 157
- BEAN, ELWOOD L. (chairman); trends in air-conditioning regulation, 1456
- BEAN, ELWOOD L. (with O'DONOVAN); treatment with ozone, 1167
- BEHNKE, JEROLD J.; *notes and comment*—similar hydraulic characteristics of three sand textures, 675
- BELL, GEORGE R.; removal of manganese by controlled precipitation and filtration, 655
- BELL, GEORGE R.; removal of soluble iron by filtration, 458
- BENJES, HENRY H.; operator torques for butterfly valves, 1139
- BERGER, BERNARD B.; *notes and comment*—international hydrological decade, 546
- BEST, LOIS C. (with GELDREICH, CLARK & HUFF); fecal-coliform-organism medium for the membrane filter technique, 208
- BIANCHI, W. C. (with HASKELL); development and dissipation of ground water mounds beneath square recharge basins, 349
- BIRD, E. D. (with BLACK, KINMAN, THOMAS & FREUND); use of iodine for disinfection, 1401
- BIRKNER, F. B. (with BLACK & MORGAN); destabilization of dilute clay suspensions with labeled polymers, 1547
- BISHOP, WILLIAM D. (with KIM & LUDWIG); cation-exchange capacity and pH in the coagulation process, 327
- BLACK, A. P.; BIRKNER, F. B.; & MORGAN, J. J.; destabilization of dilute clay suspensions with labeled polymers, 1547
- BLACK, A. P. & CHEN, CHING-LIN; electrophoretic studies of coagulation and flocculation of river sediment suspensions with aluminum sulfate, 354
- BLACK, A. P. & HANNAH, SIDNEY A.; measurement of low turbidities, 901
- BLACK, A. P.; KINMAN, R. N.; THOMAS, W. C., JR.; FREUND, GERHARD; & BIRD, E. D.; use of iodine for disinfection, 1401
- BLACK, A. P. (with KRAMER & MORGAN); research needs for drinking water, 3
- BLACK, A. P. & SMITH, ANNIE L.; improvements in instrumentation and techniques for microelectrophoresis, 485
- BLOOMFIELD, RICHARD A.; GUYON, JOHN C.; & MURMANN, R. KENT; suggested rapid method for nitrate with rhenium and syn-phenyl-2-pyridyl ketoxime, 935
- BODHAINE, GEORGE L.; role of water in the Pacific Northwest, 973
- BOLAND, JOHN J. & DEARMENT, WALLACE E.; potassium permanganate removal of tastes and odors, 1451
- BOOTH, ROBERT L.; ENGLISH, JOHN N.; & McDERMOTT, GERALD N.; evaluation of sampling conditions in the carbon adsorption method, 215
- BOTT, RODERICK F.; cross-connection control and backflow prevention in San Diego, Calif., 437

- BOYD, JOSEPHINE W. (*with* BOYD); water supply and sewage disposal developments in the far north, 858
- BOYD, WILLIAM L. & BOYD, JOSEPHINE W.; water supply and sewage disposal developments in the far north, 858
- BUDRICK, ROBERT J.; *notes and comment*—interception basins for oil spills, 543
- BURKE, GEORGE W., JR. (*with* YOUNG & POPOWCHAK); correlation of degree of pollution with chemical costs, 293
- BURZELL, LINDEN R.; expanded concept of water service, 1285
- BYRD, KENNETH D. & KERR, S. LOGAN; design and construction of industrial water line in Birmingham, 1367
- CAMPBELL, S. J. (*with* RADZIUL & FLENTJE); new developments in deposition of calcite linings in small-diameter pipe, 1328
- CAMPBELL, SYLVESTER J. (*with* BAKER & ANSPACH); electrophoretic and taste and odor measurements in plant control, 363
- CAPPJO, JOHN T.; accident investigation and record keeping, 574
- CARPER, W. H.; planning for supply at Raleigh, N.C., 1294
- CHAUDHURI, NILAY; ENGELBRECHT, R. S.; & AUSTIN, JOHN H.; nematodes in an aerobic waste treatment plant, 1561
- CHEEVERS, W. P. (*with* RHINES); decontamination of membrane filter holders by ultraviolet light, 500
- CHEN, CHING-LIN (*with* BLACK); electrophoretic studies of coagulation and flocculation of river sediment suspensions with aluminum sulfate, 354
- CLARK, HAROLD F. (*with* GELDREICH, HUFF & BEST); fecal-coliform-organism medium for the membrane filter technique, 208
- COBB, EDWIN B.; expansion of treatment facilities at Groton, Conn., 298
- COHEN, JESSE M. (*with* ROBECK, DOSTAL & KREISSL); effectiveness of water treatment processes in pesticide removal, 181
- COLE, DALE W. (*with* GESSEL); influence of removal of forest cover on movement of water associated elements through soil, 1301
- CONLEY, WALTER ROBERTSON, JR.; integration of the clarification process, 1333
- CORNELIUS, JAMES (*with* GREENBERG & MAEHLER); evaluation of the carbon adsorption method, 791
- CROW, WILLIAM B. & EIDNESS, FREDERIC A.; savings through instrumentation and control in two water systems, 1509
- CSALLANY, SANDOR C.; relationship between water use and population in the Embarras River basin, Illinois, 391
- DEARMENT, WALLACE E. (*with* BOLAND); potassium permanganate removal of tastes and odors, 1451
- DEGEER, MYRON W.; brine control projects in the Arkansas and Red River basins, 707
- DEGEER, MYRON (*with* HAGER); investigation of natural brine and its control in the Arkansas and Red River basins, 383
- DEMPSTER, GEORGE R., JR. & STEVENS, HERBERT H., JR.; concurrent collection of hydraulic and sediment data in rivers, 1135
- DEZUANE, JOHN (*with* ROMER & SCHAIBLE); emergency water supplies for New York City, 1099
- DODSON, ROY E. & MULFORD, STEWART F.; use of distilled sea water at San Diego, 1106
- DOSTAL, KENNETH A.; PIERSON, REX C.; HAGER, DONALD G.; & ROBECK, GORDON G.; carbon bed design criteria study at Nitro, W. Va., 663
- DOSTAL, KENNETH A. (*with* ROBECK, COHEN & KREISSL); effectiveness of water treatment processes in pesticide removal, 181
- DYKMANS, M. J. & WATTERS, CLARENCE G.; *joint discussion*—prestressed concrete tanks, 591
- DURHAM, WILLIAM F.; physiologic effects of pesticide use, 1311
- DUYNISLAGER, WILLIAM A.; earthquake recovery at Anchorage, 571
- DYER, GARVIN H. (*with* FAUST); *joint discussion*—reorientation to meet the challenge of quality water, 677
- EDWARDS, GAIL P.; MOLOF, ALAN H.; & SCHNEEMAN, RICHARD W.; determination of orthophosphate in fresh and saline waters, 917
- EIDNESS, FREDERIC A. (*with* CROW); savings through instrumentation and control in two water systems, 1509

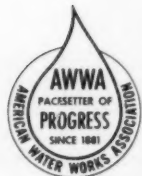
- ELIASSEN, ROLF; WYCKOFF, BRUCE M.; & TONKIN, CHARLES D.; ion exchange for reclamation of reusable supplies, 1113
- ENGELBRECHT, R. S. (with CHAUDHURI & AUSTIN); nematodes in an aerobic waste treatment plant, 1561
- ENGELBRECHT, RICHARD S. (with O'CONNOR & KOMOLRIT); evaluation of the ortho-phenanthroline method for ferrous-iron determination, 926
- ENGLISH, JOHN N. (with BOOTH & McDERMOTT); evaluation of sampling conditions in the carbon adsorption method, 215
- ETTINGER, MORRIS B.; developments in detection of trace organic contaminants, 453
- EVANS, RALPH; industrial wastes and water supplies, 625
- FAUST, RAYMOND J. & DYER, GARVIN H.; *joint discussion*—reorientation to meet the challenge of quality water, 677
- FAUST, RAYMOND J.; report of the audit of association funds, 539
- FAUST, SAMUEL D. (with ALY); removal of 2,4-dichlorophenoxyacetic acid derivatives from natural waters, 221
- FAUST, SAMUEL D. & HUNTER, NANCY E.; chemical methods for the detection of aquatic herbicides, 1028; *erratum*, 1389
- FISHER, GORDON P.; new look at resources policy, 255
- FJELSTED, EZRA J.; watershed and reservoir management, 981
- FLENTJE, MARTIN E. (with HAGER); removal of organic contaminants by granular-carbon filtration, 1440
- FLENTJE, MARTIN E. (with RADZIUL & CAMPBELL); new developments in deposition of calcite linings in small-diameter pipe, 1328
- FREUND, GERHARD (with BLACK, KINMAN, THOMAS, & BIRD); use of iodine for disinfection, 1401
- GAUFIN, ARDEN R. (with WARNICK); determination of pesticides by electron capture gas chromatography, 1023
- GELDRICH, EDWIN E.; CLARK, HAROLD F.; HUFF, CLIFTON B.; & BEST, LOIS C.; fecal-coliform-organism medium for the membrane filter technique, 208
- GERSTEIN, HYMAN H.; Lake Michigan pollution and Chicago's supply, 841
- GESSEL, STANLEY P. & COLE, DALE W.; influence of removal of forest cover on movement of water and associated elements through soil, 1301
- GILLENWATER, LYHLE E.; stream pollution by chemical spills from common carriers, 201
- GOSLIN, IVAL V.; water needs of the Pacific slope, 1238
- GRAHAM, RALPH E.; Personnel Advisory Council in the San Diego Utility, 147
- GREENBERG, ARNOLD E.; MAEHLER, CLAUDE Z.; & CORNELIUS, JAMES; evaluation of the carbon adsorption method, 791
- GUYON, JOHN C. (with BLOOMFIELD & MURMANN); suggested rapid method for nitrate with rhenium and syn-phenyl-2-pyridyl ketoxime, 935
- HABERER, JAMES H. (with LYNCH & BAKER); experiences with microstraining at Ilion, 1422
- HAGER, WALTER R. & DEGEER, MYRON; investigation of natural brine and its control in the Arkansas and Red River basins, 383
- HAGER, DONALD G. (with DOSTAL, PIERSON & ROBECK); carbon bed design criteria study at Nitro, W.Va., 663
- HAGER, DONALD G. & FLENTJE, MARTIN E.; removal of organic contaminants by granular-carbon filtration, 1440
- HAHN, RICHARD B. & MARSH, RICHARD H.; determination of radioactive cobalt, 234
- HAHN, RICHARD B. & ROSS, HARLEY H.; determination of radioactive phosphorus, 231
- HALL, ERIC S. & PACKHAM, RONALD F.; coagulation of organic color with hydrolyzing coagulants, 1149
- HANEY, PAUL D. & HAMANN, CARL L.; dual water systems, 1073
- HANNAH, SIDNEY A. (with BLACK); measurement of low turbidities, 901
- HARMON, JUDSON A. & KALICHMAN, SAMUEL G.; defluoridation of drinking water in Southern California, 245
- HARRINGTON, STANFORD E.; handling of delinquent accounts in Michigan, 279
- HARTUNG, H. O.; practical considerations in defining quality water, 286
- HASKELL, E. E., JR., & BIANCHI, W. C.; development and dissipation of ground water mounds beneath square recharge basins, 349
- HATCHER, MELVIN P.; basis for rates, 273

- HATFIELD, MARK O.; western and national water resource problems, 1231
- HERBERT, D. J. (with PROKOPOVICH); sedimentation in the Delta-Mendota Canal, 375
- HEIDEL, SUMNER G.; dissolved oxygen and iron in shallow wells at Salisbury, Md., 239
- HENDERSON, KENNETH W.; supervisory-control system for the New Haven Water Co., 755
- HERRIN, CHARLES B. (with WEST); simple atomic-absorption photometer for water analysis, 492
- HERSHFIELD, DAVID M.; method for estimating probable maximum rainfall, 965
- HOWSON, LOUIS R.; consultant's approach to water revenues and rates, 1504
- HOWSON, LOUIS R. (chairman); report of the committee on standardization, 523
- HUDSON, HERBERT E., JR.; physical aspects of flocculation, 885
- HUDSON, HERBERT E., JR. (chairman); report of the committee on education, 513
- HUFF, CLIFTON B. (with GELDREICH, CLARK & BEST); fecal-coliform-organism medium for the membrane filter technique, 208
- HUNTER, NANCY E. (with FAUST); chemical methods for the detection of aquatic herbicides, 1028
- JACKSON, JAMES O.; stronger steels for tanks, 1390
- JACKSON, ROBERT E. (with RAJZIUL); cleaning and lining of small pipe at Philadelphia, 1513
- JENKINS, KENNETH H.; 1964 USPHS summary of municipal water facilities, 1360
- JENSEN, OWEN F., JR. & RAY, WILLIAM; photographic examination of wells, 441
- JOHNSON, ERIC F.; report on publications, 532
- JOHNSON, ERIC F. (with MILLAR); progress in advancement and public information, 505
- JOHNSON, RICH; joint discussion—water needs of the Pacific slope, 1238
- KALICHMAN, SAMUEL G. (with HARMON); defluoridation of drinking water in Southern California, 245
- KALLY, ELISHA; determination of water supply investment priorities in developing countries, 955
- KERR, S. LOGAN (with BYRD); design and construction of industrial water line in Birmingham, 1367
- KERRIGAN, JAMES E. & POLKOWSKI, LAWRENCE B.; experiments with plastic pre-filter media, 85
- KIM, WONSUK; LUDWIG, HARVEY F.; & BISHOP, WILLIAM D.; cation-exchange capacity and pH in the coagulation process, 327
- KINMAN, R. N. (with BLACK, THOMAS, FREUND & BIRD); use of iodine for disinfection; 1401
- KIYOSE, JIRO; development of flow computers for network analysis in Japan, 1346
- KJELLANDER, JAN & LUND, EBBA; sensitivity of *Esch. coli* and poliovirus to different forms of combined chlorine, 893
- KLEBER, JOHN P.; use of bimetallic glassy phosphates for corrosion control, 783
- KOLLAR, K. L.; Pan-American standards, 139
- KOMOLRIT, KUSUG (with O'CONNOR & ENGELBRECHT); evaluation of the orthophenanthroline method for ferrous-iron determination, 926
- KOPP, JOHN F. (with KRONER); trace elements in six water systems of the United States, 150
- KREISSL, JAMES F. (with ROBECK, DOSTAL & COHEN); effectiveness of water treatment processes in pesticide removal, 181
- KRAMER, HARRY P.; BLACK, A. P.; & MORGAN, J. J.; joint discussion—research needs for drinking water, 3
- KRONER, ROBERT C. & KOPP, JOHN F.; trace elements in six water systems of the United States, 150
- LADUE, WENDELL R. (chairman); report of the committee on professional and administrative practice, 515
- LANE, DONEL, J.; joint discussion—water needs of the Pacific slope, 1238
- LARSON, THURSTON E. (chairman); report of the committee on research, 511
- LARSON, THURSTON E. (with SOLLO); determination of free chlorine by methyl orange, 1575
- LAWHEAD, HARLEY F.; regulation of water levels in the Great Lakes, 715
- LAWRANCE, CHARLES H.; quality improvement for Lompoc, Calif., 607
- LEEFLANG, KAREL W. H.; graphic evaluation of most probable numbers, 640

- LESCOVICH, JOSEPH E.; control of hydraulic gradients by automatic valves, 763
- LEWIS, LEONARD S.; new method for handling filter bed materials, 321
- LEWIS, RONALD I.; control of sulfate-reducing bacteria, 1011
- LIPPITT, HENRY F., II (*chairman*); review of developments in water utility law, 1963-64, 15
- LOOK, EDWARD H.; industry developments in plastic pipe for water service, 1385
- LOVE, JAMES L.; RIMMER, BOB L.; TAYLOR, FRANK S.; & SCHMIDT, VICTOR R., JR.; *joint discussion*—relocation of utility lines in the Southwest, 727
- LIEBER, MAXIM & MARTIN, ALICE JOAN; detection of coliform organisms by the fluorescent-antibody method, 99
- LUDWIG, HARVEY F. (*with* KIM & BISHOP); cation-exchange capacity and pH in the coagulation process, 327
- LUND, EBBA (*with* KJELLANDER); sensitivity of *Esch. coli* and poliovirus to different forms of combined chlorine, 893
- LYNCH, WILLIAM O.; BAKER, CHARLES R.; & HABERER, JAMES H.; experiences with microstraining at Ilion, 1422
- MAEHLER, CLAUDE Z. (*with* GREENBERG & CORNELIUS); evaluation of the carbon adsorption method, 791
- MAIER, F. J. (*chairman*); status of fluoridation in the United States and Canada, 1963, 76
- MAIER, F. J. (*chairman*); status of fluoridation in the United States and Canada, 1964, 1472
- MARSH, RICHARD H. (*with* HAHN); determination of radioactive cobalt, 234
- MARTIN, ALICE JOAN (*with* LIEBER); detection of coliform organisms by the fluorescent-antibody method, 99
- MAXWELL, JOHN C.; prospects for future water supply in the United States, 549
- MCCAUGHAN, FRANK A.; pneumatic application of cement-mortar tank coatings, 1145
- MCDERMOTT, GERALD N. (*with* BOOTH & GERALD); evaluation of sampling conditions in the carbon adsorption method, 215
- MCPHERSON, MURRAY B. & WOOD, GARY; operating options for pumped equalizing storage, 869
- MEEHAN, JOHN J.; water resources policies of the Chamber of Commerce of the United States, 1499
- MILLAR, ROBERT S. & JOHNSON, ERIC F.; progress in advancement and public information, 505
- MILLER, WALLACE T.; durability of cement-mortar linings in cast-iron pipe, 773
- MOLOF, ALAN H. (*with* EDWARDS & SCHNEEMAN); determination of orthophosphate in fresh and saline waters, 917
- MORGAN, J. J. (*with* BLACK & BIRKNER); destabilization of dilute clay suspensions with labeled polymers, 1547
- MORGAN, J. J. & STUMM, WERNER; analytical chemistry of aqueous manganese, 107
- MORGAN, J. J. (*with* KRAMMER & BLACK); research needs for drinking water, 3
- MULFORD, STEWART F. (*with* DODSON); use of distilled sea water at San Diego, 1106
- MURDOCH, JOHN H., JR.; 75 years of too cheap water—9 years later, 943
- MURDOCH, JOHN H., JR.; utility liability for injuries, 10
- MURMANN, R. KENT (*with* BLOOMFIELD & GUYON); suggested rapid method for nitrate with rhenium and syn-phenyl-2-pyridyl ketoxime, 935
- NACE, RAYMOND L.; status of the International Hydrological Decade, 819
- NELSON, SAMUEL B.; water needs of the Pacific slope, 1238
- NEUNER, EDWARD J.; innovations in financing municipal utilities, 561
- NICHOLS, M. STARR; nitrates in the environment, 1319
- OCKERSHAUSEN, R. W.; use of liquid alum in water plants, 309
- O'CONNOR, JOHN T.; KOMOLRIT, KUSUG; & ENGELBRECHT, RICHARD S.; evaluation of the orthophenanthroline method for ferrous-iron determination, 926
- O'DONOVAN, D. C. & BEAN, ELWOOD L.; *joint discussion*—treatment with ozone, 1167
- PACKARD, VERNON L.; prototype study of uniform modular filter components, 766
- PACKHAM, RONALD F. (*with* HALL); coagulation of organic color with hydrolyzing coagulants, 1149
- PAGET, A. F.; *joint discussion*—water needs of the Pacific slope, 1238

- PATTERSON, W. L.; comparison of elements affecting rates in water and other utilities, 554
- PIERSON, REX C. (with DOSTAL, HAGER & ROBECK); carbon bed design criteria study at Nitro, W.Va., 663
- POLKOWSKI, LAWRENCE B. (with KERRIGAN); experiments with plastic prefilter media, 85
- POPOWCHAK, THEODORE (with YOUNG & BURKE); correlation of degree of pollution with chemical costs, 293
- POWERS, J. PATRICK; well point systems for ground water supply, 1131
- PROKOPOVICH, N. P. & HERBERT, D. J.; sedimentation in the Delta-Mendota Canal, 375
- PROKOPOVICH, NIKOLA P.; siltation and pollution problems in Spring Creek, Shasta County, Calif., 986
- RADZIUL, JOSEPH V.; CAMPBELL, S. J.; & FLENTJE, MARTIN E.; new developments in deposition of calcite linings in small-diameter pipe, 1328
- RADZIUL, JOSEPH V. & JACKSON, ROBERT E.; cleaning and lining of small pipe at Philadelphia, 1513
- RAY, WILLIAM (with JENSEN); photographic examination of wells, 441
- REITLER, RUDOLF (with SELIGMANN); enteropathogens in water with low *Esch. coli* titer, 1572
- RHINES, C. E. & CHEEVERS, W. P.; decontamination of membrane filter holders by ultraviolet light, 500
- RIMMER, BOB L. (with LOVE, TAYLOR & WILSON); joint discussion—relocation of utility lines in the Southwest, 727
- ROBECK, GORDON G.; DOSTAL, KENNETH A.; COHEN, JESSE M.; & KREISSL, JAMES F.; effectiveness of water treatment processes in pesticide removal, 181
- ROBECK, GORDON G. (with DOSTAL, PIERSON & HAGER); carbon bed design criteria study at Nitro, W.Va., 663
- ROBECK, GORDON G. (with SYMONS & WEIBEL); impoundment influences on water quality, 51
- ROBINOVÉ, CHARLES J.; infrared photography and imagery in water resources research, 834
- ROMER, HAROLD; DEZUANE, JOHN; & SCHAI-
BLE, GEORGE, J., JR.; emergency water supplies for New York City, 1099
- ROSS, HARLEY H. (with HAHN); determination of radioactive phosphorus, 231
- RUBLE, EARL H.; industrial water requirements, 831
- SAWYER, CLAIR N.; problem of phosphorus in water supplies, 1431
- SCHNEEMAN, RICHARD W. (with EDWARDS & MOLOF); determination of orthophosphate in fresh and saline waters, 917
- SCHAIBLE, GEORGE J., JR. (with ROMER & DEZUANE); emergency water supplies for New York City, 1099
- SCOTT, GORDON N.; corrosion protection properties of portland cement concrete, 1038
- SEABLOOM, ROBERT W. (with SYLVESTER); influence of site characteristics on quality of impounded water, 1528
- SELIGMANN, RACHEL & REITLER, RUDOLF; enteropathogens in water with low *Esch. coli* titer, 1572
- SHEAR, JAMES A.; some facts about water as a resource, 423
- SHULL, KENNETH E.; experiences with multiple-bed filters, 314
- SIGWORTH, E. A.; identification and removal of herbicides and pesticides, 1016
- SKEAT, WILLIAM O.; trends in water engineering in Great Britain, 824
- SKINNER, ROBERT A.; sea water conversion study in Southern California, 694
- SKRINDE, R. T. (with SPICHER); effects of potassium permanganate on pure organic compounds, 472
- SMITH, ANNIE L. (with BLACK); improvements in instrumentation and techniques for microelectrophoresis, 485
- SMITH, H. N.; effects of conservation techniques on yield, 544
- SMITH, JAMES T.; wage administration through job evaluation, 262
- SOGHA, MAX K.; construction of the second Los Angeles aqueduct, 699
- SOLLO, FRANK W., JR. & LARSON, THURSTON E.; determination of free chlorine by methyl orange, 1575
- SPICHER, R. G. & SKRINDE, R. T.; effects of potassium permanganate on pure organic compounds, 472
- STAHL, ERVIN H. A.; development and uses of ground water supplies, 1123
- STEVENS, HERBERT H., JR. (with DEMPSTER); concurrent collection of hydraulic and sediment data in rivers, 1135

- STRAMEL, GILBERT J.; maintenance of well efficiency, 996
- STUM, WERNER (*with MORGAN*); analytical chemistry of aqueous manganese, 107
- SYLVESTER, ROBERT O. & SEABLOOM, ROBERT W.; influence of site characteristics on quality of impounded water, 1528
- SYMONS, JAMES M.; WEIBEL, SAMUEL R.; & ROBECK, GORDON G.; impoundment influences on water quality, 51
- TAYLOR, FRANK S. (*with LOVE, RIMMER & WILSON*); *joint discussion*—relocation of utility lines in the Southwest, 727
- TEMPERLEY, TOM GROOME; Kuwait's water supply, 416
- THOMAS, HAROLD E. (*with WALLER & VORHIS*); effects of the Good Friday earthquake on water supplies, 123
- THOMAS, W. C., JR. (*with BLACK, KINMAN, FREUND & BIRD*); use of iodine for disinfection, 1401
- TODE, DAVID K.; nuclear craters for ground water recharge, 429
- TONKIN, CHARLES D. (*with ELIASSEN & WYCKOFF*); ion exchange for reclamation of reusable supplies, 1113
- TRESTER, RALPH H.; management control tools, 1355
- VORHIS, ROBERT C. (*with WALLER & THOMAS*); effects of the Good Friday earthquake on water supplies, 123
- WALLER, ROGER M.; THOMAS, HAROLD E.; & VORHIS, ROBERT C.; effects of the Good Friday earthquake on water supplies, 123
- WARNICK, STEPHEN L. & GAUFIN, ARDEN R.; determination of pesticides by electron capture gas chromatograph, 1023
- WATTERS, CLARENCE G. (*with DYKMANS*); *joint discussion*—prestressed concrete tanks, 597
- WEIBEL, SAMUEL R. (*with SYMONS & ROBECK*); impoundment influences on water quality, 51
- WEST, PHILIP W. & HERRIN, CHARLES B.; simple atomic-absorption photometer for water analysis, 492
- WILFORD, JOHN; revision of New Jersey regulations for design of public water supply facilities, 737
- WILLIAMS, ROBERT L.; microelectrophoretic studies of coagulation with aluminum sulfate, 801
- WILSON, JACK H. (*with LOVE, RIMMER & TAYLOR*); *joint discussion*—relocation of utility lines in the Southwest, 727
- WITTER, C. J.; effects of forest management on watersheds, 448
- WOLFF, JEROME B.; city-county cost allocation for capital improvements at Baltimore, 722
- WOLMAN, ABEL; effects of population changes on environmental-health problems and programs, 811
- WOLMAN, M. GORDON; national interest and the nation's waters, 1273
- WOOD, GARY (*with MCPHERSON*); operating options for pumped equalizing storage, 869
- WOODS, CHARLES E.; principles of discounting for main extensions, 397
- WOODS, CHARLES E.; similarities in economic theory and sound extension policy, 1289
- WOODWARD, RICHARD L. & BAXTER, SAMUEL S.; *notes and comment*—at MacDonald's farm, 120
- WRIGHT, KENNETH R.; water line freeze problems in mountainous Colorado communities, 746
- WYCKOFF, BRUCE M. (*with ELIASSEN & TONKIN*); ion exchange for reclamation of reusable supplies, 1113
- WYSS, GERARD A.; work area safety on streets and highways, 948
- YOUNG, G. KENNETH, JR.; POPOWCHAK, THEODORE; & BURKE, GEORGE W., JR.; correlation of degree of pollution with chemical costs, 293



Journal

AMERICAN
WATER WORKS
ASSOCIATION

VOLUME 57 • 1965

AMERICAN WATER WORKS ASSOCIATION
Incorporated

2 Park Ave., New York, N.Y. 10016

Table of Contents

January

Water, Men, and Management.....	E. JERRY ALLEN	1
Research Needs for Drinking Water.....	HARRY P. KRAMER	3
Discussion.....	A. P. BLACK & J. J. MORGAN	6
Utility Liability for Injuries.....	JOHN H. MURDOCH JR.	10
Review of Developments in Water Utility Law, 1963-64.....	ABA SUBCOMMITTEE REPORT	15
New York State Water Law.....	ARMAND L. ADAMS	39
Impoundment Influences on Water Quality	JAMES M. SYMONS, SAMUEL R. WEIBEL & GORDON G. ROBECK	51
Style Change for Citation of Periodicals in References.....		75
Status of Fluoridation.....	TASK GROUP REPORT	76
Experiments With Plastic Prefilter Media	JAMES E. KERRIGAN & LAWRENCE B. POLKOWSKI	85
Monthly Water Bond Interest Costs and Sales.....		98
Detection of Coliform Organisms by the Fluorescent-Antibody Method	MAXIM LIEBER & ALICE JOAN MARTIN	99
Analytical Chemistry of Aqueous Manganese.....	J. J. MORGAN & WERNER STUMM	107
Notes and Comment:		
At MacDonald's Farm.....	RICHARD L. WOODWARD	120
	SAMUEL S. BAXTER	121

February

Effects of the Good Friday Earthquake on Water Supplies	ROGER M. WALLER, HAROLD E. THOMAS & ROBERT C. VORHIS	123
National Water Emergency Plan.....	OFFICE OF EMERGENCY PLANNING	132
Pan-American Standards.....	K. L. KOLLAR	139
Reprints Available.....		146
Personnel Advisory Council in the San Diego Utility.....	RALPH E. GRAHAM	147
Trace Elements in Six Water Systems of the United States	ROBERT C. KRONER & JOHN F. KOPP	150
Diatomite Filters for Municipal Use.....	TASK GROUP REPORT	157
Effectiveness of Water Treatment Processes in Pesticide Removal	GORDON G. ROBECK, KENNETH A. DOSTAL, JESSE M. COHEN & JAMES F. KREISSL	181
Coagulant Aids for Potable Water Treatment.....		200
Stream Pollution by Chemical Spills From Common Carriers.....	LYHLE E. GILLENWATER	201
Fecal-Coliform-Organism Medium for the Membrane Filter Technique	EDWIN E. GELBREICH, HAROLD F. CLARK, CLIFTON B. HUFF & LOIS C. BEST	208
Evaluation of Sampling Conditions in the Carbon Adsorption Method	ROBERT L. BOOTH, JOHN N. ENGLISH & GERALD N. McDERMOTT	215
Removal of 2,4-Dichlorophenoxyacetic Acid Derivatives From Natural Waters	OSMAN M. ALY & SAMUEL D. FAUST	221
Determination of Radioactive Phosphorus.....	RICHARD B. HAHN & HARLEY H. ROSS	231
Determination of Radioactive Cobalt.....	RICHARD B. HAHN & RICHARD H. MARSH	234

Dissolved Oxygen and Iron in Shallow Wells at Salisbury, Md.....	SUMNER G. HEIDEL	239
Defluoridation of Drinking Water in Southern California	JUDSON A. HARMON & SAMUEL G. KALICHMAN	245

March

New Look at Resources Policy.....	GORDON P. FISHER	255
Wage Administration Through Job Evaluation.....	JAMES T. SMITH	262
Recruitment and Training of Engineers.....	THOMAS V. ADAMS	267
Basis for Rates.....	MELVIN P. HATCHER	273
Handling of Delinquent Accounts in Michigan.....	STANFORD E. HARRINGTON	279
Practical Considerations in Defining Quality Water.....	H. O. HARTUNG	286
Correlation of Degree of Pollution With Chemical Costs		
G. KENNETH YOUNG JR., THEODORE POPOWCHAK & GEORGE W. BURKE JR.		293
Correction—Detection of Coliform Organisms by the Fluorescent-Antibody Method (MAXIM LIEBER & ALICE JOAN MARTIN).....		297
Expansion of Treatment Facilities at Groton, Conn.	EDWIN B. COBB	298
Use of Liquid Alum in Water Plants.....	R. W. OCKERSHAUSEN	309
Experiences With Multiple-Bed Filters.....	KENNETH E. SHULL	314
New Method for Handling Filter Bed Materials.....	LEONARD S. LEWIS	321
Cation-Exchange Capacity and pH in the Coagulation Process		
WONSUK KIM, HARVEY F. LUDWIG & WILLIAM D. BISHOP		327
Development and Dissipation of Ground Water Mounds Beneath Square Recharge Basins.....	E. E. HASKELL JR. & W. C. BIANCHI	349
Electrophoretic Studies of Coagulation and Flocculation of River Sediment Suspensions With Aluminum Sulfate.....	A. P. BLACK & CHING-LIN CHEN	354
Electrophoretic and Taste and Odor Measurements in Plant Control		
ROBERT A. BAKER, SYLVESTER J. CAMPBELL & FREDERICK R. ANSPACH		363
Sedimentation in the Delta-Mendota Canal.....	N. P. PROKOPOVICH & D. J. HEBERT	375
Investigation of Natural Brine and Its Control in the Arkansas and Red River Basins		
WALTER R. HAGER & MYRON DEGEER		383
Relationship Between Water Use and Population in the Embarras River Basin, Illinois		
SANDOR C. CSALLANY		391

April

Principles of Discounting for Main Extensions.....	CHARLES E. WOODS	397
Service Lives of Water Mains at Springfield, Mass.	ELLWOOD C. ALDRICH	410
Kuwait's Water Supply.....	TOM GROOME TEMPERLEY	416
Some Facts About Water as a Resource.....	JAMES A. SHEAR	423
Nuclear Craters for Ground Water Recharge.....	DAVID K. TODD	429
Cross-Connection Control and Backflow Prevention in San Diego, Calif.		
RODERICK F. BOTT		437
Photographic Examination of Wells.....	OWEN F. JENSEN JR. & WILLIAM RAY	441
Effects of Forest Management on Watersheds.....	C. J. WITTER	448
Developments in Detection of Trace Organic Contaminants.....	MORRIS B. ETTINGER	453
Removal of Soluble Iron by Filtration.....	GEORGE R. BELL	458
Effects of Potassium Permanganate on Pure Organic Compounds		
R. G. SPICHER & R. T. SKRINDE		472

Improvements in Instrumentation and Techniques for Microelectrophoresis	A. P. BLACK & ANNIE L. SMITH	485
USPHS Pesticides Manual.....		491
Simple Atomic-Absorption Photometer for Water Analysis	PHILIP W. WEST & CHARLES B. HERRIN	492
Decontamination of Membrane Filter Holders by Ultraviolet Light	C. E. RHINES & W. P. CHEEVERS	500
Progress in Advancement and Public Information	ROBERT S. MILLAR & ERIC F. JOHNSON	505
Report of the Committee on Research.....	THURSTON E. LARSON	511
Report of the Committee on Education.....	HERBERT E. HUDSON JR.	513
Report of the Committee on Professional and Administrative Practice	WENDELL R. LADUE	515
Report of the Committee on Standardization.....	LOUIS R. HOWSON	523
Report on Publications.....	ERIC F. JOHNSON	532
Report of the Audit of Association Funds.....	RAYMOND J. FAUST	539
Notes and Comment:		
Interception Basins for Oil Spills.....	ROBERT J. BUDRICK	543
Effects of Conservation Techniques on Yield.....	H. N. SMITH	544
International Hydrological Decade.....	BERNARD B. BERGER	546

May

Prospects for Future Water Supply in the United States.....	JOHN C. MAXWELL	549
Comparison of Elements Affecting Rates in Water and Other Utilities	W. L. PATTERSON	554
Innovations in Financing Municipal Utilities.....	EDWARD J. NEUNER	561
Water Supply Districts in the United States.....		569
Earthquake Recovery at Anchorage.....	WILLIAM A. DUYNLAGER	571
Accident Investigation and Record Keeping.....	JOHN T. CAPPIO	574
Experience With Metallizing of Water Tanks in Two Cities— <i>Joint Discussion</i>		
Erie, Pa.	WALLACE E. DEARMONT	585
Cincinnati, Ohio.....	WILLIAM F. REEVES	586
Prestressed Concrete Tanks— <i>Joint Discussion</i>		
Design Factors and Economy.....	M. J. DYKMANS	591
Maintenance and Repair.....	CLARENCE G. WATTERS	597
Description of Continuous Pumping.....	MELVILLE W. AUBERY	601
Quality Improvement for Lompoc, Calif.....	CHARLES H. LAWRENCE	607
New Serial Publication on Hydrosience.....		624
Industrial Wastes and Water Supplies.....	RALPH EVANS	625
Experience With Injection Wells for Artificial Ground Water Recharge	TASK GROUP REPORT	629
Change of Name of WSWMA.....		639
Graphic Evaluation of Most Probable Numbers.....	KAREL W. H. LEEFLANG	640
Removal of Manganese by Controlled Precipitation and Filtration....	GEORGE R. BELL	655
Carbon Bed Design Criteria Study at Nitro, W.Va.	KENNETH A. DOSTAL, REX C. PIERSON, DONALD G. HAGER & GORDON G. ROBECK	663
Notes and Comment:		
Similar Hydraulic Characteristics of Three Sand Textures.....	JEROLD J. BEHNKE	675

June

Reorientation to Meet the Challenge of Quality Water— <i>Joint Discussion</i>	
RAYMOND J. FAUST & GARVIN H. DYER	677
Cost Indexes for Water Utility Property	693
Sea Water Conversion Study in Southern California	ROBERT A. SKINNER 694
Construction of the Second Los Angeles Aqueduct	MAX K. SOCHA 699
Brine Control Projects in the Arkansas and Red River Basins	MYRON W. DEGEER 707
Regulation of Water Levels in the Great Lakes	HARLEY F. LAWHEAD 715
City-County Cost Allocation for Capital Improvements at Baltimore	JEROME B. WOLFF 722
Relocation of Utility Lines in the Southwest— <i>Joint Discussion</i>	
Lafayette, La.	JAMES L. LOVE 727
El Dorado, Ark.	BOB L. RIMMER 730
Oklahoma City, Okla.	FRANK S. TAYLOR 731
Little Rock, Ark.	JACK H. WILSON 733
Austin, Tex.	VICTOR R. SCHMIDT JR. 735
Revision of New Jersey Regulations for Design of Public Water Supply Facilities	
JOHN WILFORD	737
Water Line Freeze Problems in Mountainous Colorado Communities	
KENNETH R. WRIGHT	746
Supervisory-Control System for the New Haven Water Co.	KENNETH W. HENDERSON 755
Control of Hydraulic Gradients by Automatic Valves	JOSEPH E. LESCOVICH 763
Prototype Study of Uniform Modular Filter Components	VERNON L. PACKARD 766
Durability of Cement-Mortar Linings in Cast-Iron Pipe	WALLACE T. MILLER 773
Use of Bimetallic Glassy Phosphates for Corrosion Control	JOHN P. KLEBER 783
Evaluation of the Carbon Adsorption Method	
ARNOLD E. GREENBERG, CLAUDE Z. MAEHLER & JAMES CORNELIUS	791
Coagulant Aids for Potable-Water Treatment	800
Microelectrophoretic Studies of Coagulation With Aluminum Sulfate	
ROBERT L. WILLIAMS	801

July

Effects of Population Changes on Environmental-Health Problems and Programs	
ABEL WOLMAN	811
Status of the International Hydrological Decade	RAYMOND L. NACE 819
Trends in Water Engineering in Great Britain	WILLIAM O. SKEAT 824
Correction—Interception Basins for Oil Spills (ROBERT J. BUDRICK)	830
Industrial Water Requirements	EARL H. RUBLE 831
Infrared Photography and Imagery in Water Resources Research	
CHARLES J. ROBINOVE	834
Lake Michigan Pollution and Chicago's Supply	HYMAN H. GERSTEIN 841
Water Supply and Sewage Disposal Developments in the Far North	
WILLIAM L. BOYD & JOSEPHINE W. BOYD	858
Operating Options for Pumped Equalizing Storage	
MURRAY B. MCPHERSON & GARY WOOD	869
Physical Aspects of Flocculation	HERBERT E. HUDSON JR. 885
Sensitivity of <i>Esch. Coli</i> and Poliovirus to Different Forms of Combined Chlorine	
JAN KJELLANDER & EBBE LUND	893
Measurement of Low Turbidities	A. P. BLACK & SIDNEY A. HANNAH 901
Determination of Orthophosphate in Fresh and Saline Waters	
GAIL P. EDWARDS, ALAN H. MOLOF & RICHARD W. SCHNEEMAN	917

Evaluation of the Orthophenanthroline Method for Ferrous-Iron Determination	
JOHN T. O'CONNOR, KUSUG KOMOLRIT & RICHARD S. ENGELBRECHT	926
Suggested Rapid Method for Nitrate With Rhenium and Syn-Phenyl-2-Pyridyl Ketoxime.....	RICHARD A. BLOOMFIELD, JOHN C. GUYON & R. KENT MURMANN 935
Tentative AWWA Standard for Sodium Chlorite.....	AWWA B303-65T 938

August

75 Years of Too Cheap Water—9 Years Later.....	JOHN H. MURDOCH JR.	943
Work Area Safety on Streets and Highways.....	GERARD A. WYSS	948
Determination of Water Supply Investment Priorities in Developing Countries	ELISHA KALLY	955
Method for Estimating Probable Maximum Rainfall.....	DAVID M. HERSHFIELD	965
Amendment to AWWA Bylaws.....		972
Role of Water in the Pacific Northwest.....	GEORGE L. BODHAINE	973
Watershed and Reservoir Management.....	EZRA J. FJELDSTED	981
Siltation and Pollution Problems in Spring Creek, Shasta County, Calif.	NIKOLA P. PROKOPOVICH	986
Maintenance of Well Efficiency.....	GILBERT J. STRAMEL	996
Control of Sulfate-Reducing Bacteria.....	RONALD F. LEWIS	1011
Identification and Removal of Herbicides and Pesticides.....	E. A. SIGWORTH	1016
Determination of Pesticides by Electron Capture Gas Chromatography	STEPHEN L. WARNICK & ARDEN R. GAUFIN	1023
Chemical Methods for the Detection of Aquatic Herbicides	SAMUEL D. FAUST & NANCY E. HUNTER	1028
Corrosion Protection Properties of Portland Cement Concrete.....	GORDON N. SCOTT	1038
American Standard for the Thickness Design of Ductile-Iron Pipe	ASA A21.50-1965 (AWWA H3-65)	1053

September

Dual Water Systems.....	PAUL D. HANEY & CARL L. HAMANN	1073
Emergency Water Supplies for New York City	HAROLD ROMER, JOHN DE ZUANE & GEORGE J. SCHAIKLE JR.	1099
Use of Distilled Sea Water at San Diego....	ROY E. DODSON & STEWART F. MULFORD	1106
Ion Exchange for Reclamation of Reusable Supplies	ROLF ELIASSEN, BRUCE M. WYCKOFF & CHARLES D. TONKIN	1113
Development and Uses of Ground Water Supplies.....	ERVIN H. A. STAHL	1123
Well Point Systems for Ground Water Supply.....	J. PATRICK POWERS	1131
Concurrent Collection of Hydraulic and Sediment Data in Rivers	GEORGE R. DEMPSTER JR. & HERBERT H. STEVENS JR.	1135
Operator Torques for Butterfly Valves.....	HENRY H. BENJES	1139
Pneumatic Application of Cement-Mortar Tank Coatings....	FRANK A. MCCAUGHAN	1145
Coagulation of Organic Color With Hydrolyzing Coagulants	ERIC S. HALL & RONALD F. PACKHAM	1149
Treatment With Ozone.....	D. C. O'DONOVAN	1167
Discussion.....	ELWOOD L. BEAN	1193
Twelfth Edition of <i>Standard Methods</i>		1194
A Tribute to W. Chester Morse.....	E. JERRY ALLEN	1195
AWWA C603 Advanced to "Standard".....		1200

American Standard for 2-in. and 2½-in. Cast-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.....	ASA A21.12-1965 (AWWA C112-65)	1201
American Standard.....		1210
American Standard for Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids	ASA A21.51-1965 (AWWA C151-65)	1211

October

Western and National Water Resource Problems.....	MARK O. HATFIELD	1231
Water Needs of the Pacific Slope— <i>Joint Discussion</i>		
Description of Region.....	HARVEY O. BANKS	1238
Arizona.....	RICH JOHNSON	1239
British Columbia.....	A. F. PAGET	1243
California.....	SAMUEL B. NELSON	1248
Oregon and Washington.....	DONEL J. LANE	1257
Utah.....	IVAL V. GOSLIN	1262
National Interest and the Nation's Waters.....	M. GORDON WOLMAN	1273
Expanded Concept of Water Service.....	LINDEN R. BURZELL	1285
Similarities in Economic Theory and Sound Extension Policy.....	CHARLES E. WOODS	1289
Planning for Supply at Raleigh, N.C.....	W. H. CARPER	1294
Influence of Removal of Forest Cover on Movement of Water and Associated Elements Through Soil.....	STANLEY P. GESSEL & DALE W. COLE	1301
Physiologic Effects of Pesticide Use.....	WILLIAM F. DURHAM	1311
Nitrates in the Environment.....	M. STARR NICHOLS	1319
New Developments in Deposition of Calcite Linings in Small-Diameter Pipe	JOSEPH V. RADZIUL, S. J. CAMPBELL, & MARTIN E. FLENTJE	1328
Integration of the Clarification Process.....	WALTER ROBERTSON CONLEY JR.	1333
Development of Flow Computers for Network Analysis in Japan.....	JIRO KIOSE	1346
Monthly Water Bond Interest Costs and Sales.....		1354

November

Management Control Tools.....	RALPH H. TRESTER	1355
1964 USPHS Summary of Municipal Water Facilities.....	KENNETH H. JENKINS	1360
Design and Construction of Industrial Water Line in Birmingham	KENNETH D. BYRD & S. LOGAN KERR	1367
Industry Developments in Plastic Pipe for Water Service.....	EDWARD H. LOOK	1385
Correction—Chemical Methods for the Detection of Aquatic Herbicides (SAMUEL D. FAUST & NANCY E. HUNTER).....		1389
Stronger Steels for Tanks.....	JAMES O. JACKSON	1390
Use of Iodine for Disinfection	A. P. BLACK, R. N. KINMAN, W. C. THOMAS JR., GERHARD FREUND & E. D. BIRD	1401
Experiences With Microstraining at Ilion	WILLIAM O. LYNCH, CHARLES R. BAKER & JAMES H. HABERER	1422
Problem of Phosphorus in Water Supplies.....	CLAIR N. SAWYER	1431
Coagulant Aids for Potable-Water Treatment.....		1439
Removal of Organic Contaminants by Granular-Carbon Filtration	DONALD G. HAGER & MARTIN E. FLENTJE	1440
Potassium Permanganate Removal of Tastes and Odors	JOHN J. BOLAND & WALLACE E. DEARMONT	1451
Trends in Air-Conditioning Regulation.....	COMMITTEE REPORT	1456
Status of Fluoridation.....	TASK GROUP REPORT	1472

December

Water Resources Policies of the Chamber of Commerce of the United States	JOHN J. MEEHAN	1499
Consultant's Approach to Water Revenues and Rates.....	LOUIS R. HOWSON	1504
Savings Through Instrumentation and Control in Two Water Systems	WILLIAM B. CROW & FREDERIC A. EIDNESS	1509
Cleaning and Lining of Small Pipe at Philadelphia	JOSEPH V. RADZIUL & ROBERT E. JACKSON	1513
Influence of Site Characteristics on Quality of Impounded Water	ROBERT O. SYLVESTER & ROBERT W. SEABLOOM	1528
Destabilization of Dilute Clay Suspensions With Labeled Polymers	A. P. BLACK, F. B. BIRKNER, & J. J. MORGAN	1547
Binding the Year's Journals.....		1560
Nematodes in an Aerobic Waste Treatment Plant	NILAY CHAUDHURI, R. S. ENGELBRECHT, & JOHN H. AUSTIN	1561
Enteropathogens in Water With Low <i>Esch. Coli</i> Titer	RACHEL SELIGMANN & RUDOLF REITLER	1572
Determination of Free Chlorine by Methyl Orange	FRANK W. SOLLO JR. & THURSTON E. LARSON	1575
85th Annual Conference—Portland, Ore.....		1586
Papers Scheduled at 1965 Section Meetings.....		1604
Index on Volume 57, 1965		
Subject Index		1615
Author Index		1626

